

TABLE 1
ACTIVITY PATTERN OF *BUFO PARIETALIS* IN
PUSHPAGIRI WILDLIFE SANCTUARY, KARNATAKA

Months	Activity	Time (hrs)
Feb.-Mar.	Calling chorus, aggregation, breeding	1830 to 0545 (Daily)
Apr.-May	Feeding, resting in water	1900 to 2400 (once in 7-10 days)
Jun.-Aug.	Dormancy	—
Sep.-Jan.	Feeding	1840 to 0600 (Daily)

fruitflies as the principal constituent of the diet, along with ants and cockroaches. A 30.5 mm cockroach wing was observed in the excreta of a female toad (105.6 mm SVL).

Calling: During the breeding season, hundreds of male toads called in chorus. The call was loud, harsh and aggressive, and given in series of 11-18. The low tone call resembled that of the pond heron (*Ardeola grayii*) — *kwak kwak kwak kwak*. The number of calls varied from 11-28 per minute.

Breeding: Not much is known of the breeding season of these toads. In Silent Valley, it breeds during December (Daniels 1992). We observed breeding from February to March. More than 200 calling males gather around the puddles of the perennial slow streams that flow under

the canopy cover. All the puddles (n=8) measured 2-3 m in width with 30 cm deep clear water, and plenty of decaying vegetation. The water temperature was 28 °C. After the initial calling, amplexus was observed in more than 50 frogs. The amplexus remained for more than 12 hrs, and continued even during the day in the water. A clutch-size of approximately 200 eggs was observed in two cases.

ACKNOWLEDGEMENTS

We thank Mr. Shivanna Hassan, Deputy Conservator of Forests, Karnataka Forest Department, for permission to undertake the study. We acknowledge Prof. Hegde, Vice Chancellor, University of Mysore and Prof. Cletus D'Souza for encouragement. The study was funded through the India Programs of the Wildlife Conservation Society, New York.

March 21, 2001

SAVITHA N. KRISHNA
SHARATH B. KRISHNA
Department of Biosciences,
University of Mysore,
Hemangangothri, Hassan,
Karnataka 573 220, India.

REFERENCES

BOULENGER, G.A. (1882): Catalogue of the Batrachia Salientia s. Ecaudata of the British Museum. 2nd Edn. London.

DANIEL, J.C. (1963): Field guide to amphibians of western

India, Part 1, *J. Bombay nat. Hist. Soc.* 60: 434-435.

DANIELS, R.J. RANJIT (1992): Range extension in some south Indian amphibians. *Hamadryad* 17: 40-42.

19. DISTRIBUTION OF *BUFO STOMATICUS* LÜTKEN, AMPHIBIA: FAMILY BUFONIDAE, IN ASSAM, NORTHEAST INDIA

Bufo stomaticus Lütken (Anura: Bufonidae) is a tropical and subtropical species occurring in a variety of conditions from warm, humid, mixed forests to almost perennially arid, stony places, supporting only scattered shrubs and grasses. However, its abundance is greater in regions experiencing dry and wet seasons supported by a

monsoon climate (Auffenberg and Rehman 1997). Lütken originally described *Bufo stomaticus* from Assam (Dutta 1997), but did not specify a locality. Later, it was described as a common species from the Indian subcontinent (Lower Bengal: Annandale 1909; Maharashtra: Yazdani and Mahabal 1976; Himachal Pradesh: Tilak and

Mehta 1977; Gujarat: Sarkar 1984; Orissa: Dutta 1988; Bihar, Karnataka, Jammu & Kashmir: Sekar 1991; West Bengal: Sarkar *et al.* 1992; Andhra Pradesh: Sarkar *et al.* 1993; the Ganga Basin: Chanda 1991; Nepal: Zug and Mitchel 1995; Rajasthan: Sharma 1999). Subsequent investigations have failed to record this species from Assam. A recent review on geographic variation (Auffenberg and Rehman 1997) also did not include specimens from its type locality. This communication deals with the distribution of *Bufo stomaticus* in Assam and its comparison with the geographic variations observed by Auffenberg and Rehman (1997).

The study is based on 17 specimens collected between 1998-2000 from Orang National Park (92° 15'-92° 30' E and 26° 30'-26° 40' N, district Darrang), Kuriahmari (a riverine island of the Brahmaputra, 91° 09'-91° 18' E and 25° 59'-26° 05' N, district Nalbari), Baghbor (90° 55' E and 26° 10' N, district Barpeta) and Balipara Reserve Forest (92° 39'-92° 51' E and 26° 53'-27° 01' N, district Sonitpur). All specimens are housed in the Museum of Arya Vidyapeeth College (KUR 6988-89, BGB 6991-6995, ONP 10-17 and BLP 3008) except two that are registered in ZSI, Kolkata (A9098-99). Specimens were collected by hand and morphometric measurements were taken with dial Vernier calipers. We analysed and performed student t-test for five characters which were:

SVL - Snout vent length

VTYD - Vertical tympanum diameter: greatest vertical diameter

PAL - Parotid gland length: greatest antero-posterior length of parotid gland

PAW - Parotid gland width: greatest transverse distance of parotid gland.

TL - Tibia length: distance between posteriormost part of tarso-metatarsal to anteriormost part of articulation between tibia and femur.

Bufo stomaticus was found to be abundant in and around human habitation in the districts

of Barpeta, Nalbari, Darrang and Sonitpur in Assam. All localities are on the north bank, except Kuriahmari, which is an island in the middle of the River Brahmaputra. No collection/observation could be made on the south bank, despite active searches. It appears that the Brahmaputra acts as a barrier in distribution. The habitat of *B. stomaticus* is moist, thick broadleaf matted grass with occasional scrubs. It was found to be syntopic with the more common *B. melanostictus* in Orang National Park (NP) and Baghbor. However, no *B. melanostictus* could be found in Kuriahmari. Both *B. stomaticus* and *B. melanostictus* were recorded as human commensal, but in Orang NP and Baghbor, *B. stomaticus* seemed to prefer less disturbed areas than *B. melanostictus*. Balipara forms the extreme east of its range of distribution. The species is included in the checklist of Chakrashila Wildlife Sanctuary (95° 15'- 90° 20' E and 26° 15'-26° 26' N, district Dhubri; Datta *et al.* 1998), but this requires further confirmation from specimens.

As in all bufonid species, the SVL of the female of *Bufo stomaticus* is statistically ($P>0.01$) larger than the males. The proportional length of other characters in male and female do not show significant variation except PAW (Table 1). Our observation is in conformity with that of Mahapatro and Dash (1991), and Auffenberg and Rehman (1997) except for PAW.

The mean value of VTYD standardized against SVL (SVL/VTYD) is 15.62. The Assam set is comparable to Orissa (19.91, Auffenberg

TABLE 1
MORPHOMETRIC MEASUREMENTS (MM) OF MALE AND FEMALE *BUFO STOMATICUS* FROM ASSAM

Parameter	Male	Female
SVL	56.91	67.48
VTYD	3.74	4.07
PAL	15.05	16.70
PAW	9.20	10.68
TL	21.61	24.04

and Rehman 1997) and appears to be a distinct geographic morphocline representing north-eastern India.

The mean value of parotid gland length (PAL) standardized against SVL (SVL/PAL) is 4.00. Auffenberg and Rehman (1997) considered the central Indo-Gangetic-Indus river plains' populations (SVL/PAL 4.17) which represent the average condition with respect to PAL. That the proportionate parotid gland length tends to decrease in all directions from this central area is supported by our observation.

The mean TL standardized with SVL (SVL/TL) is 2.74. There occurs a distinct geographical morphocline from Kumaon Himalayas all along the Gangetic plain where

the value gradually decreases. The Assam set value is again different from the populations from central and eastern India.

ACKNOWLEDGEMENTS

The authors thank Indraneil Das, S.K. Dutta and S.K. Chanda for their suggestions and the Assam Forest Department for logistic support.

August 17, 2001

N. K. CHOUDHURY

M.F. AHMED

S. SENGUPTA

Zoology Department,
Arya Vidyapeeth College,
Guwahati 781 016, Assam, India.

REFERENCES

- ANNANDALE, N. (1909): Notes on Indian Batrachia. *Rec. Indian Mus.* 3: 282-286.
- AUFFENBERG, W. & H. REHMAN (1997): Geographic variation in *Bufo stomaticus*, with remarks on *Bufo olivaceus*: Biogeographical and systematic implications. In: Biodiversity of Pakistan (Eds: Mufti, S.A., C.A. Woods, S.A. Hasan). Pakistan Museum of Natural History, Islamabad, Florida Museum of Natural History, Gainesville. Pp. 351-372.
- CHANDA, S.K. (1991): Amphibia: Faunal Resource of Ganga. Part I. Zoological Survey of India, pp. 51-57.
- CHANDA, S.K. (1994): Anura (Amphibia) of northeast India. *Mem. Zool. Surv. India* 18: 1-143.
- DATTA, S., J.M. DATTA & M.P. PHUKAN (1998): Chakrashila Wildlife Sanctuary (A documentation of its biodiversity) Nature's Beckon. Dhubri. 45 pp.
- DUTTA, S.K. (1988): First record of *Bufo stomaticus* and *Bufo fergusonii* from Orissa, with comments on their distribution. *J. Bombay nat. Hist. Soc.* 85(2): 439-440.
- DUTTA, S.K. (1997): Amphibians of India and Sri Lanka (Checklist and Bibliography). Odyssey Publishing House, Bhubaneswar, India. 342+xxii pp.
- MAHAPATRO, B.K. & M.C. DASH (1991): Breeding behaviour and morphometric relation of *Bufo stomaticus* Lütken (Anura: Amphibia). *J. Bombay nat. Hist. Soc.* 88(1): 20-25.
- SARKAR, A.K. (1984): Ecological studies on the amphibians of Gujarat. *Bull. Zool Surv. India* 6(1-3): 87-93.
- SARKAR, A.K. M.L. BISWAS & S. RAY (1992): Fauna of West Bengal: Amphibia. In: State Fauna Series, Zoological Survey of India, 3(2): 67-100.
- SARKAR, A.K., P.K. CHANDRA & S. RAY (1993): Fauna of Andhra Pradesh: Amphibia. In: State Fauna Series, Zoological Survey of India, 5(1): 65-87.
- SEKAR, A.G. (1991): Distribution of amphibian fauna of India. *J. Bombay nat. Hist. Soc.* 88(1): 125-127.
- SHARMA, S.K. (1999): Some new distribution sites of amphibians in Rajasthan. *Frog leg* 3: 1-2.
- TILAK, R. & H.S. MEHATA (1977): Report on a collection of amphibians from district Kangra, Himachal Pradesh. *Newsl. Zool. Surv. India* 3(4): 196-198.
- YAZDANI, G.M. & A. MAHABAL (1976): Amphibians of Poona. *Newsl. Zool. Surv. India* 2(4): 138-139.
- ZUG, G.R. & J.C. MITCHEL (1995): Amphibians and reptiles of Royal Chitwan National Park, Nepal. *Asiatic Herpetol. Res.* 6: 172-180.

20. TAXONOMIC VARIATION IN *SCHISTURA VINCIGUERRAE* (HORA, 1935) FROM THE BASISTHA RIVER, A NEW RECORD FROM ASSAM, INDIA

The hill streams of Assam harbor varied fauna, which has not yet been fully assessed.

Several workers have studied the fish fauna of the hill streams of Assam, namely Hora (1935),